



First Aero Weekly in the World.

Founder and Editor : STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 722. (No. 43, Vol. XIV.)

OCTOBER 26, 1922

Weekly, Price 6d.
Post free, 7d.

Flight

The Aircraft Engineer and Airships

Editorial Offices : 36, GREAT QUEEN STREET, KINGSWAY, W.C. 2

Telegrams : Truditur, Westcent, London. Telephone : Gerrard 1828

Annual Subscription Rates, Post Free :

* United Kingdom .. 30s. 4d. Abroad .. 33s. 6d.*

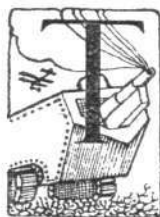
These rates are subject to any alteration found necessary under abnormal conditions and to increases in postage rates

* European subscriptions must be remitted in British currency

CONTENTS

	PAGE
Editorial Comment	
The Case for Metal Construction	619
The Gliding Competition	620
And the Lesson	623
Peyrot Gliders	621
Gliding, Soaring and Air-Sailing	624
Personals	629
London Terminal Aerodrome	630
London-Continental Services	630
Airisms from the Four Winds	631
The Case for Metal Construction: By J. D. North	632
Royal Air Force	633
R.A.F. Appointments	633
Royal Aeronautical Society Official Notices	634
Society of Model Aeronautical Engineers	634

EDITORIAL COMMENT.



HOSE who had expected Mr. J. D. North to give, in his lecture before the Royal Aeronautical Society, an historical sketch of the development of metal construction of aircraft, were doomed to disappointment, as were also those who had expected him to expound a process of design. Mr. North wisely chose to refrain from dealing with his subject from either of these points of view. Instead he confined himself to general remarks on the pros and cons of metal construction, and indicated certain advantages which may be obtained by its use.

First and foremost among these he placed reduction in structure weight, which he estimated as somewhere in the neighbourhood of from the present average of 33 per cent. to about 25 or 27 per cent. of the total. He showed that this reduction, which at first sight does not appear particularly startling, results in an increase in the revenue load of from 34 per cent. to 42 per cent., or an increase of nearly 25 per cent. in the utility of the aeroplane. These figures relate to machines having a power loading of 15 lbs./h.p., which is a very fair average for the modern commercial aeroplane. In the case of high-performance military machines, the gain is vastly greater, and Mr. North pointed out that, in many cases, the reduction in percentage of structure weight which can be gained by the employment of metal construction, makes possible a type of machine which would otherwise be placed out of court. He did not suggest that the whole of this gain was immediately capable of realisation, but, on theoretical and practical experimental grounds, he considered that there was a reasonable probability of arriving at a structure weight of 25 per cent. to 27 per cent. at no very distant date.

As Mr. North and Boulton and Paul's, of Norwich, have probably had greater experience of metal construction than any other British firm at the present time, we can only accept their views, and express the hope that metal construction will be given the encouragement which its promises appear to warrant. That the work is difficult will be readily granted, and there can be few who will not agree with Mr. North when he states that "Aeroplanes are not designed by

DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list :

1922.

- Oct. 26 Royal Aero Club Dinner at Savoy Hotel, celebrating the Schneider Cup victory and first King's Cup Race
- Nov. 2 Lecture, "A Review of Airscrew and Helicopter Theory," by Maj. A. R. Low, before R.Ae.S.
- Nov. 30 Closing date for FLIGHT Glider Designing Competition
- Dec. 15-
Jan. 2 Paris Aero Exhibition

1923.

- June International Air Congress, London
- Dec. 1 Entries close for French Aero Engine Competition

1924.

- Mar. 1 French Aero Engine Competition
- Mar. 15 Entries close for Dutch Height Indicator Competition

science but by art, in spite of some pretence and humbug to the contrary." Particularly happy is, we think, his illustration of the manner in which, to a very great extent, the aircraft designer works. "To arrive analytically," he says, "by measuring the frictional coefficient of the cloth and the resilience of the balls and cushions, at the precise way to play a complicated stroke at billiards is practically hopeless, but practice and a knowledge of principles deduced from scientific analysis of simple cases will produce surprising results. So it is that, over a wide range, light metal members can be designed with every confidence that they will fulfil their designer's expectations and realise the advantages in weight economy foreshadowed by the properties of the materials."

The Gliding Competition

There was a strong dramatic element in the finish of the gliding competition for the *Daily Mail* £1,000 prize and several subsidiary prizes. The winning machine, as well as that which made the second best showing on the last day of the competition, had not been out of its tent until brought out for its record-breaking flight. As it was wheeled along the ridge towards Firlie Beacon, it is a fair guess that not one out of every thousand who saw it recognised in it the prize-winner. Yet the minute the Peyret had left the ground it was obvious that here was a machine which had controllability to an amazing extent, and M. Maneyrol very soon proved himself not only a good pilot, but an excellent judge of wind conditions. With perfect mastery of his craft he swung to and fro, and appeared to have not the slightest difficulty—except for a short period just before he reached Raynham's duration—in remaining in the ascending air currents.

No less of a surprise was Sqdn.-Ldr. Gray's machine, which was composed of an old Bristol Fighter fuselage, on which had been fitted a Fokker D. VII wing. The "Brokker," as it was nicknamed, caused great amusement when it failed to get off in the first start, but the amusement changed to admiration when the machine got away and soared upwards under perfect control. Both machines handled extremely well, and the "Brokker" appeared to indicate that ample controllability is not necessarily incompatible with "orthodox" design.

Until the appearance of the Peyret and "Brokker," there had been no serious challenger of Raynham's performance, and the opinion was freely expressed on

Saturday morning that the prize was as good as won. The win by another competitor at the eleventh hour was but another instance of Raynham's proverbial luck—or ill-luck. Time after time Raynham has been within sight of winning a big event, and time after time something has happened at the last moment to snatch victory from his grasp. We are extremely sorry that Raynham's ill-luck should have dogged him again this time, but we hope and believe that he will not let himself be discouraged from trying again. We realise that this may sound a good deal like a council of perfection, and that after his many disappointments Raynham might well be excused from further attempts. Should this be the case, the loss to British sporting aviation would be a great one, as Raynham is extremely popular in all aviation circles.

To Gordon England we express our sympathy in his sad misfortune. His machine was a fine piece of work, and he had been flying it very well indeed up to the moment of his accident. In spite of its small size, the machine was one of the steadiest of all the competing machines, and but for this stroke of bad luck it would undoubtedly have done well on the last day, when the wind was of suitable force for it.

And the Lesson

Several facts appear to stand out clearly as a result of the competition. One of these is that ample controllability is of greater importance than extreme efficiency, and another is that light loading is not imperative. We do not know what is the weight of Sqdn.-Ldr. Gray's "Brokker," but in view of the fact that both its wing and its fuselage were designed for very much greater loads than those encountered in a glider, the structure weight must have been very considerable. Yet the machine performed extraordinarily well.

A further point brought out was that the country around Itford and Firlie is very suitable for gliding, at any rate with northerly and easterly winds. How machines will fare in the winds which had been expected, *i.e.*, southerly and south-westerly winds, yet remains to be seen. The southern slopes are not nearly so steep, and the extent to which they give soarability is at present a matter for speculation. However, if, as we hope, the site is to be retained permanently, this problem should be solved before long.

In the meantime, our congratulations to all concerned in the meeting, competitors as well as organisers!

Japanese Decorations for Air Mission Members

FROM Tokio it is announced that in recognition of their great service to the naval flying forces of Japan, decorations ranging from the Third Class Order of the Rising Sun to the Sixth Class Order of the Sacred Treasure have been granted by Imperial decree to the thirty commissioned and non-commissioned officers composing the British aviation mission in Japan. The decorations were presented at a full dress parade held at Kasumigaura flying station by Rear-Admiral Tajiri, of the Imperial Japanese Navy.

Captain the Master of Sempill, commanding officer of the mission, was given the Third Class Order of the Rising Sun, and Commander Meares was given the Third Class Order of the Sacred Treasure.

Other decorations are Lieut.-Commanders Fowler, Atkinson, Eldridge, Brackley, Smith, and Orde-Lees, Fourth Class Order of the Rising Sun. Lieut.-Commander Orde-Lees has gained widespread recognition in Japan on account of his parachute descents, and because of his feat in climbing Mount Fuji last mid-winter, something that Japanese have never accomplished, though they have made many attempts.

Lieuts. Pollard, Bryan, Loton and Vaughan-Fowler and Surgn.-Lieut. Jones, Fifth Class Order of the Rising Sun; Sub-Lieuts. Brutnell, Sheret Hatfield, Landamore and Volkert, Sixth Class Order of the Rising Sun; Warrant Officers Crisp, Satchell, Bond, Williams, Farwaker, Redmond, Adams, Manton, Hunter, Ellis Ford and Sherras, Sixth Class Order of the Sacred Treasure.

In all probability the British instructors will remain attached to the Japanese Navy until 1924, or even longer.

Groves Memorial Prize Essay Awards

THE awards in the 1922 competition for the R. M. Groves Memorial Essay on "A Forecast of Aerial Development," open to members of the R.A.F., are as follow:

1. Squadron Leader A. A. Walser, M.C., D.F.C., Air Ministry.
 2. Squadron Leader B. E. Smythies, D.F.C., R.A.F., Staff College, Andover.
 3. Wing Commander J. T. Babington, D.S.O., Headquarters, No. 7 Group, Andover.
- Special prize for imaginative *résumé* on "Aviation in the Next World War"—Wing Commander J. T. Babington.

THE PEYRET TANDEM MONOPLANE

Details of the Winning Machine

UNUSUAL as is the aerodynamic design of the Peyret tandem monoplane, its construction appealed to all experts at the first glance, and even before the machine took the air it was conceded that, whatever peculiar views M. Peyret might have on the subject of disposition of wing surfaces, side areas, etc., he knew how to build a glider. The three-ply

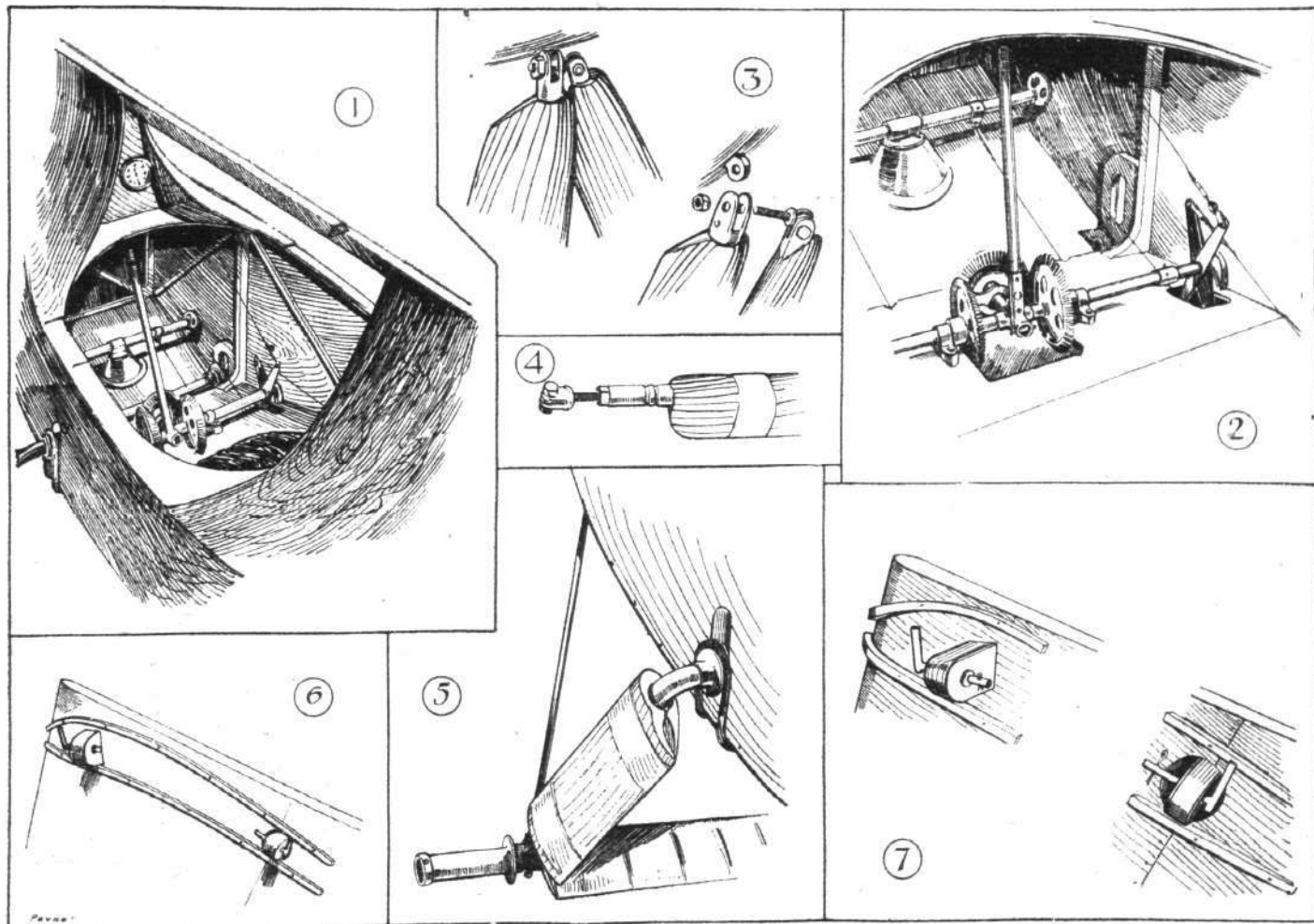
Everybody was "taken in," and before the start most of us expected to see the machine crash on the hill-side. No sooner was it in the air, however, than it became evident that here was a machine which had something that most of the others lacked, *i.e.*, controllability to an amazing extent. That it was as efficient, regarded purely as a glider in still air, as



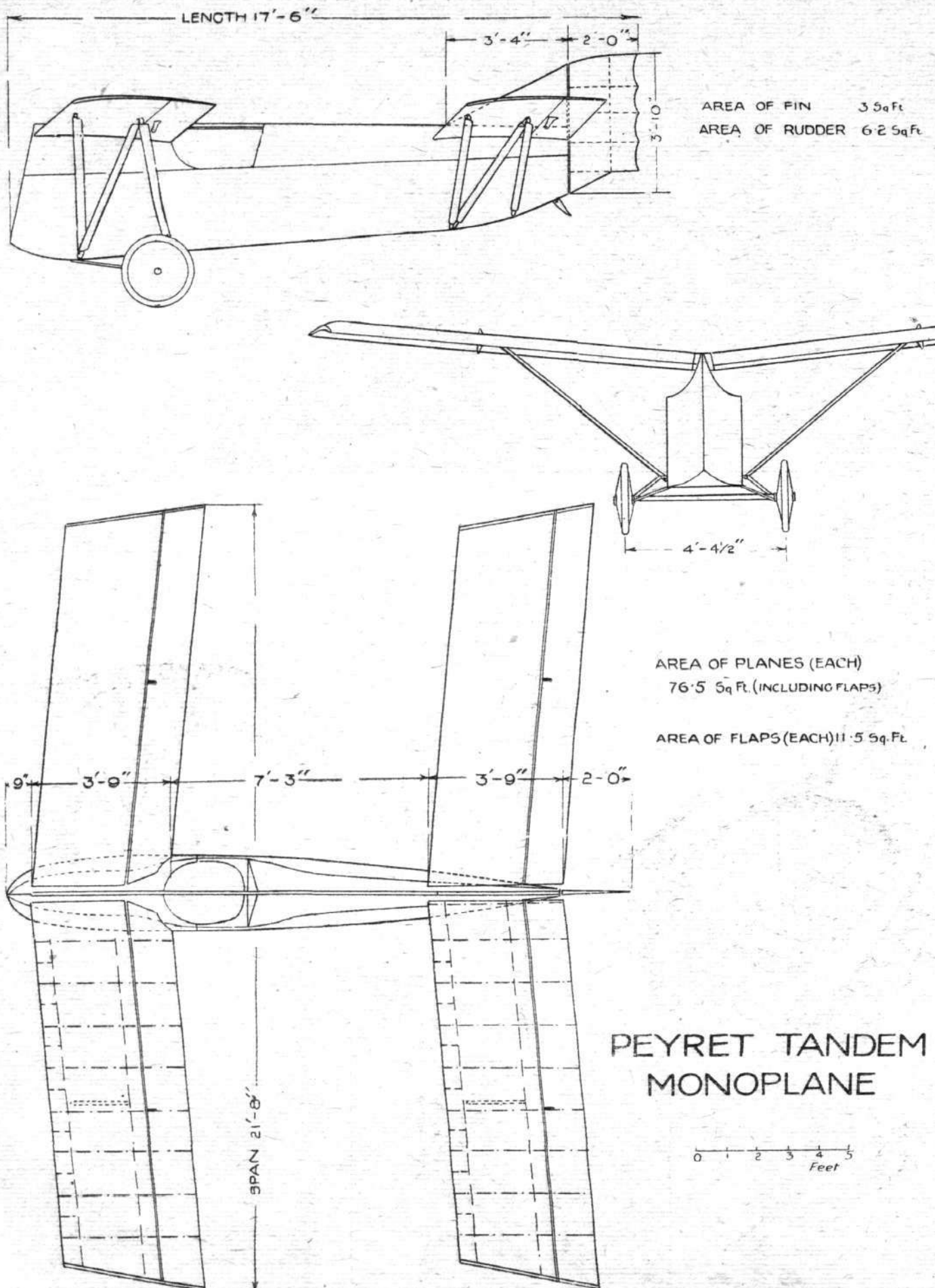
The Winner:
Bringing the
Peyret mono-
plane up to the
top of Firle
Beacon.

mahogany fuselage was evidently the work of an expert, and the wing bracing with one set of "N" struts on each side gave great rigidity in spite of evidently slender spars. Also, the differential control arrangement certainly looked extremely unlike what one would expect from an amateur enthusiast. Yet the fact remains that no one, ourselves included, really took the machine seriously until it had left the ground. It is useless to pretend that it was otherwise.

some of the others might be open to doubt, but that the pilot did have abundant control could not be doubted for one moment. The short, sharp turns bore testimony to that, as did the fact that even the most vigilant observation of the machine failed to reveal more than the slightest movement of the ailerons, indicating that at no time were the controls used to anything approaching their fullest extent. The rudder could be seen moving slightly from side to side,



THE PEYRET MONOPLANE: Some constructional details. 1, View into the cockpit, showing controls and position of air speed indicator. 2, The differential control by which the flaps are operated as combined ailerons and elevators. 3 and 4, Details of the wing bracing strut attachments. 5, One side of the undercarriage. The wheel has been omitted for the sake of clearness. 6, Front wing roots on fuselage. 7, Details of spar attachment to fuselage. Note metal-faced ply-wood wing roots, and quick-release bolts,



THE PEYRET MONOPLANE : Plan, side and front elevations, to scale.

but otherwise only a minimum of control appeared to be required. Having thus frankly admitted our failure to appreciate at first sight the merits of the Peyret monoplane, we may proceed to give a detailed description of the machine.

The Peyret monoplane glider is of a type which has for many years been considered rather inefficient. Wind tunnel experiments on tandem surfaces have shown the rear plane to be far less efficient than the front one, and consequently, when large area was required combined with small span, designers got into the habit of choosing the biplane or triplane arrangement. Nor should we like to assert that they were wrong where power-driven machines are concerned. To employ the large rear plane means carrying about a considerable amount of rather superfluous structure weight which can ill be afforded. In a glider, however, this is but a small price to pay for the amazing controllability which the tandem arrangement gives, and to M. Peyret is due the credit for having realised this. Not only so, but having failed to find a French constructor willing to build the machine, M. Peyret set to work and built it himself. The whole of the work, therefore, is his own, from the first conception to the finished machine.

The tandem arrangement of the lifting surfaces necessitates a very strong fuselage; especially is this so when one considers the torsional stresses to which the fuselage may be subjected owing to a gust striking one wing before the other. Now the ply-wood covered type of fuselage is exceptionally good in torsion, hence this form of construction was chosen. The internal framework is very light, consisting of spruce longerons and struts, with here and there a multi-ply former (reduced to a mere skeleton by sawing away most of the material except diagonals) where local stresses call for extra rigidity. Over this light framework is placed a covering of three-ply mahogany, approximately $\frac{3}{8}$ in. thick.

In section the fuselage varies considerably from point to point. At the cockpit the section is approximately rectangular, while forward and aft of this point the sides are of the "tumble-home" variety. The front two-thirds of the body is surmounted by a triangular section, which towards the stern merges into the inward-sloping sides of the main structure. Immediately in front of, and also behind, the cockpit the triangular section has its sides curved inwards, so as to improve the pilot's view. Along the ridge of the triangular "roof" runs a nearly straight longitudinal member, which is extended over the pilot's cockpit. Thus a weakening of the structure at this point is avoided.

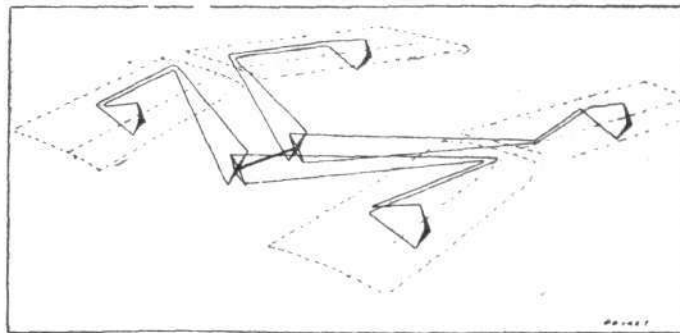
The wings are characterised by a pronounced dihedral and back-sweep. The former has doubtless been necessitated by the large side area of the fuselage, and the latter by a desire to place the pilot behind the trailing edge and yet get the centre of gravity sufficiently far forward to make the front plane more heavily loaded than the rear, thus obtaining longitudinal stability by placing the front wing at a larger angle of incidence than the rear.

Constructionally the wings, front and rear of which are of equal span and area, consist of light ribs, placed somewhat far apart, carried on tubular spars of Duralumin. Short nose ribs extending from leading edge to front spar are placed half-way between main ribs. The wing section used is fairly thin, although of considerable camber, and the wings are braced by a single pair of "N" struts (Duralumin tubes enclosed in wood fairings) on each side. These struts work in compression as well as in tension, there being no top bracing. Attachment of spars to the fuselage is by short "T"-shaped bolts passing through the ends of the tubular spars and through short roots, made of wood, built into the fuselage just below the "ridge pole."

The undercarriage is of somewhat unusual design, although being of the simple two-wheel type. The axle passes across underneath the floor of the fuselage, but another member, also a tube, shaped somewhat like a very flat inverted "U," passes through slots in the sides and carries the rubber-cord shock absorbers. Radius rods in the form of tubes run from the axle forward to points underneath the floor of the body, a short distance behind the nose. The undercarriage is divided in the centre so as to allow of removing the inverted "U," the two halves fitting into a central sleeve, where they are held by bolts.

As the greatest merit of the Peyret monoplane lies in its very effective controls, these will be dealt with at some length, and in order further to facilitate understanding of their working we would refer readers to the accompanying diagram. The essential feature of the controls themselves, apart from the system of working the four wing flaps simultaneously, is the use of a differential, formed by three bevel gears. One of these is mounted on the control column, and is placed in a transverse plane. This wheel engages with two others of the same size, but placed in a longitudinal plane.

The action is similar to that of the differential of a motor-car. When the control column is moved in a fore-and-aft direction, the two side wheels move with it, without any movement relatively to one another. When, however, the control column is moved from side to side, the two side wheels move in opposite directions. To the two side wheels are attached short shafts, carrying on their outer ends cranks from which cables run to the wing flaps. The manner of connecting up the control cranks and flap king-posts will best be understood from a reference to the diagram. From this it will be seen that when the "stick" is pushed forward the flaps of the front wing are raised, those of the rear wing lowered. When the control column is pulled back, the reverse is the case.



THE PEYRET MONOPLANE: Diagrammatic representation of the control system, by which the wing flaps are used as combined ailerons and elevators.

When the column is pushed to the left the starboard flaps of both front and rear wings are depressed, those on the port side being elevated at the same time. Pushing the "stick" to the right has, of course, the reverse action, while any combination of lateral and longitudinal movement is possible.

The same movement could, of course, be obtained by the use of crank levers, but arrangement would have to be made for the ends of one lever sliding in slots in the other, and the use of bevel gears results in a much more positive, and mechanically better, action.

Directional control is by rudder worked from a foot bar in the ordinary way. We are not quite certain as to how great effect the rudder has, placed as it is so close behind the rear plane, but it appears probable that, even assuming the rudder to be not particularly effective, the machine can be easily turned by the use of the wing flaps. In other words, the machine can probably be turned easily with the flaps, even with the rudder central, whereas we are somewhat doubtful regarding directional control with the wing flaps locked in the neutral position. Nor does it appear to matter very much, as the machine can undoubtedly be turned in a very short radius by the combined use of rudder and flaps.

Apart from its extraordinary controllability, the Peyret monoplane would appear to possess certain other advantages. Thus the view obtained from the pilot's cockpit is exceptionally good, owing to the fact that the front wing is placed relatively high so that the pilot's eyes are approximately in line with the wing chord, while he is situated behind the trailing edge and therefore has an unrestricted view downwards. Also, in a crash, the machine should offer a maximum of protection to the pilot, as there is a good deal of fuselage both in front and behind him, while laterally the two pairs of wings project a considerable distance, reinforced by the "N" struts.

Altogether, the Peyret monoplane is a machine of more than ordinary interest, and there can be little doubt that it will, as the French say, *faire école*. The tandem arrangement offers so many advantages that it is not to be doubted that machines of similar design will appear, probably incorporating detail improvements, but following the Peyret (and incidentally S. P. Langley, whose "aerodromes" were of the tandem type, and whose ideas have been vindicated to no small extent by the performance of this machine) in the disposition of their lifting surfaces.

The weight of the Peyret glider is given by M. Peyret himself as 67 kgs. (147.4 lbs.). The machine looks as if it might be heavier than that, but the wings are certainly very light, and the fuselage is probably lighter than it appears to be. The undercarriage, however, is probably fairly heavy. Assuming the weight to be 150 lbs., and the same figure for the pilot, the total weight is 300 lbs., which, with an area of 153 sq. ft., gives an average loading of 2 lbs./sq. ft. Actually the loading of the front wing is greater and that of the rear wing smaller than this figure.

GLIDING, SOARING AND AIR-SAILING

Those wishing to get in touch with others interested in matters relating to gliding and the construction of gliders are invited to write to the Editor of FLIGHT, who will be pleased to publish such communications on this page, in order to bring together those who would like to co-operate, either in forming gliding clubs or in private collaboration.

THE Designing Competition for which FLIGHT is offering prizes of £25 and £10 closes on November 30, 1922. Designs should be sent in marked with a *nom de plume*, and an envelope containing the competitor's name and address, marked on the outside with the *nom de plume* chosen, should be sent in with the design. Full particulars of the rules, etc., were published in our issue of August 31, 1922. Aerodynamic estimates and stress calculations must accompany the designs.

Arrangements are now in progress for holding a gliding meeting at Biskra in Algeria. The meeting is to be held in January next, and the chief prize will be one of 10,000 francs, offered by M. Dal Piaz. Biskra has been chosen partly because a range of hills 12 miles long and rising to 1,350 ft. is situated here, and partly because it is thought that it may prove possible to soar in the rising air currents from the hot desert.

ACCORDING to *le Temps*, M. Gabriel Voisin is offering a prize of one million francs for the glider which first covers one kilometre on a circular track at Issy-les-Moulineaux.

BOTH the winning French Peyret monoplane and Raynham's Handasyde are on view at Selfridge's during this week. This affords an excellent opportunity for those who did not visit Itford to see the two famous machines at close quarters.

SQUADRON-LEADER GRAY'S "Brokker" will probably be tried again at Itford this week-end. Its performance in the competition was extraordinary, and it seems quite possible that, given suitable weather, the "Brokker" may beat M. Maneyrol's "Peyret." We should like to see a British pilot on a British machine as holder of the world's record.

As a piece of "cheek" it would be difficult to beat the competitor who telegraphed to the Royal Aero Club officials that he had "crashed *en route*" and doubted if he would be able to take part in the competition.

THE BRITISH GLIDING COMPETITION

LEWES, Wednesday, October 18.

WEATHER conditions were not at all favourable for gliding on the third day of the British Gliding Competition, for the wind had not only considerably increased in force, but was unpleasantly gusty. It was from much the same direction, and down by the hangars below Itford Hill gusts of 20-30 m.p.h. were not infrequent, whilst up on top of the hills the wind

velocity was given as 40 m.p.h. and upwards. We no longer had the pleasant blue sky and fleecy clouds of the previous days, but low grey clouds threatening rain.

Nevertheless, Gordon England brought his machine out early, and had it carried up to Firle Beacon. Arriving there, he "went over the top" shortly after nine o'clock, and was immediately "rocketed" upwards in a by no means pleasant



SOARING AT FIRLE BEACON HILL : General view, showing a small section of the crowds who watched M. Maneyrol's splendid performance. Note the altitude above starting point.

manner. Then the struggle commenced, and he made a plucky fight to master the gusty currents. It was not long before he began to drift backwards and sideways, and eventually came down—still moving backwards!—on the edge of a slope some quarter of a mile from the starting-point. He remained at the controls, to prevent the wind taking charge of the machine, until help arrived, when the glider was carried to a more sheltered spot on the other side of the ridge. It was, he said, the first time he had ever landed backwards! His air-speed indicator showed 45 m.p.h. while he was up, and 40 m.p.h. when he was landing. His flight lasted about 1 min. 30 secs.

Shortly after this Jeyes brought his Aachen glider out, and proceeded to a point on the ridge between Beddingham and Firle Beacon. He took off at about 10.46 a.m., and got several nasty up-and-down bumps immediately he left the ground. Then, rising the meanwhile, he got blown gradually back, and so he put the nose down and slowly proceeded alongside the hill towards Firle, losing height until he reached a spur on the side of the hill, and here he attempted to land. On turning, however, the right wing tip struck the ground, and the whole wing broke completely off and started a glide on its own—landing several hundred feet away. The rest of the glider, of course, came down with a bit of a bump, upside down. As Jeyes did not make an immediate appearance some anxiety as to his safety was felt, and a rush was made to his assistance. Owing to the steep nature of the hill-side some minutes elapsed before an R.A.F. mechanic reached the machine and speedily raised the fuselage—when Jeyes stepped out, apparently untouched. The mechanic, however, fell flat on his back, and stayed there several minutes, whether from exhaustion after his record glide down the hill

or from sheer relief, we know not. Shortly after, the remains of the glider were brought up and then carried back, with the help of Boy Scouts, to Itford. Jeyes' glide was, also, of about 1½ minutes' duration.

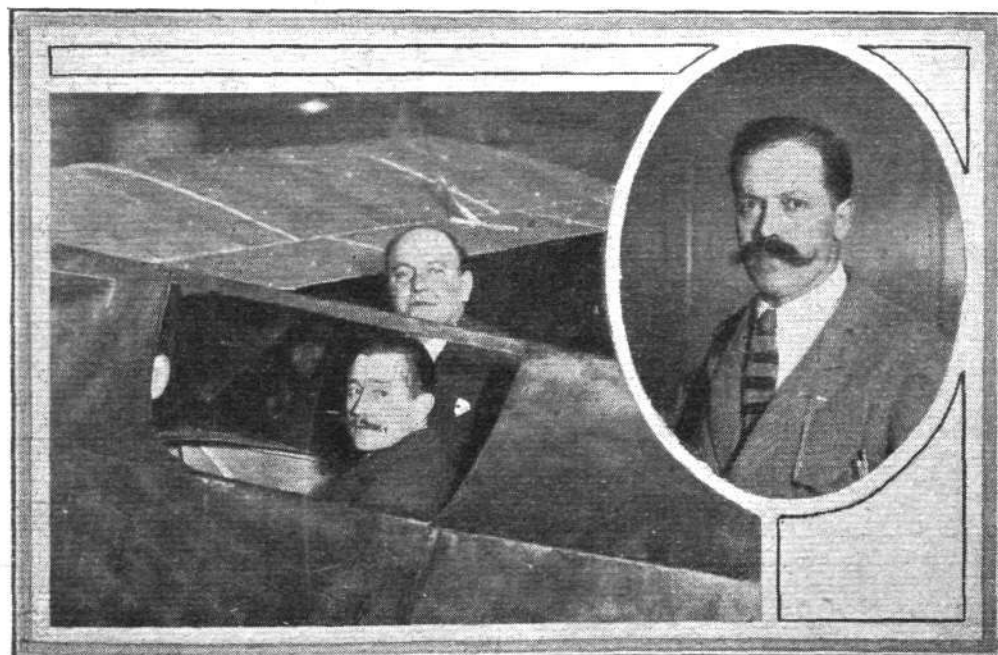
During the remainder of the day the wind, if anything, increased in force, and there was nothing further doing except a gliding contest, down the slope in the lower valley, on the two six-wheeler trolleys (used for conveying sundries up the hill by means of the kite-balloon winch). The R.Ae.C. team, piloted by Secretary Perrin, won the first race easily, but the second race ended in a dead heat—and disaster! One of the 'buses at the end of the run made a sharp left-hand turn, and, continuing down the opposite slope of the hill, eventually crashed into a gate at the bottom. Some of the "crew" managed to drop off before the crash, but some—including our old friend Howard Wright—"dropped" off after and received sundry damages to noses, legs, etc. Well, well! we had to do something to pass the time, and the spirit of the early days of flying had returned to one and all. In the meantime work on the various gliders in the hangars proceeded.

Thursday, October 19.—The wind on this, the fourth, day of the Competition was even stronger than ever, and during the night one of the hangars was blown down, with unfortunate results for Mr. Prosser's biplane glider. There was plenty to be done on the various machines, however,

and we were glad to be able to make ourselves useful lending a hand at doping, filing, riveting, etc., when required. The rudder on Raynham's 'bus looked smart with a new extension, and by the end of the day the movement of the ailerons had successfully been increased and a new air-speed indicator fitted, and all was ready for the next flight. The S.C.W. glider was also practically completed, and the Peyret tandem

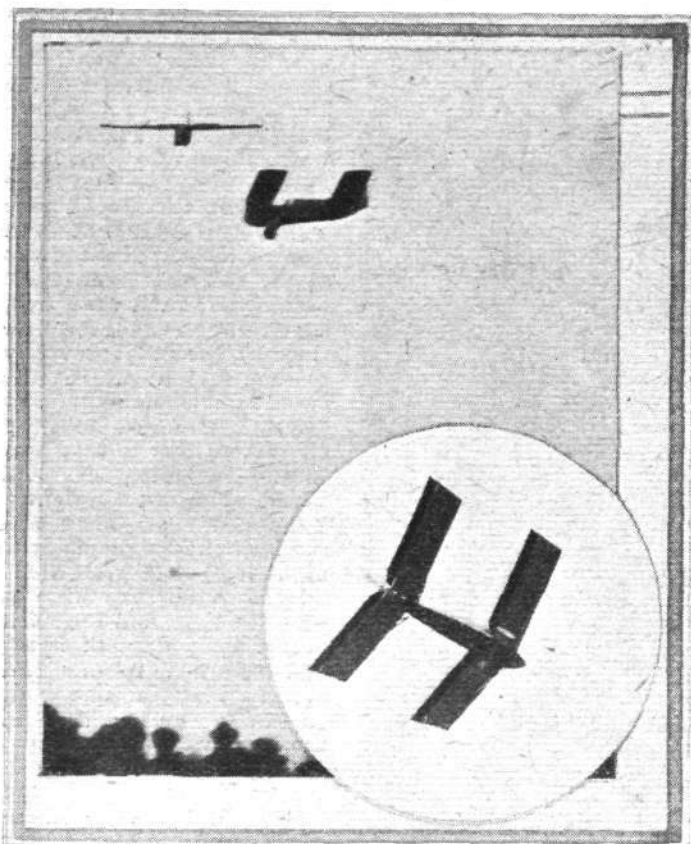


THE START OF A FAMOUS FLIGHT : M. Maneyrol's Peyret monoplane gets away on October 21 for its record flight.



The Winner : M. Maneyrol, in the cockpit of his machine, photographed at Selfridges, where the Peyret monoplane is on view this week. Behind the machine may be seen Lieut.-Commander Larrouy, manager and interpreter to M. Maneyrol. Inset, M. Louis Peyret, who designed and built the winning machine.

monoplane was beginning to look ready for business. Herne's D.H. monoplane had been converted to wing warping and was now ready for a trial flip, so late in the afternoon it was taken up to the low ridge to the north of Itford Hill. It left the catapult quite gracefully, but when about 20-30 ft. from the ground the wings were seen to start warping some-



NEAR THE FINISH: Our photograph shows the Peyret monoplane and Sqdn.-Ldr. Gray's "Brokker" in the air together. Inset, another view of the Peyret. As the machines approached one another the two pilots would wave a cheery greeting and then drift apart once more. In spite of the darkness the machines did not appear to be in any danger of colliding.

what excessively and with increasing vigour, until both wings suddenly collapsed under the strain and folded up back over the machine, which pancaked hurriedly and not too gently on a more or less even keel. Herne stepped out immediately, shaken but unhurt, and so ended the only glide of the day. It was fortunate that the wings broke just when they did, as a little farther on there was a considerable dip in the ground, which would have increased Herne's fall to an alarming extent.

During the day Gordon England, Raynham and many other enthusiastic helpers converted one of the six-wheeler trolleys—these trolleys had a rough time of it!—into a "sail-plane," by means of a mast, bowsprit, Jeyes' broken wing and sundry other items. A successful trip was accomplished, with the assistance of a few Chinese crackers, and a safe anchorage effected in a barbed-wire fence. This time there were no casualties!

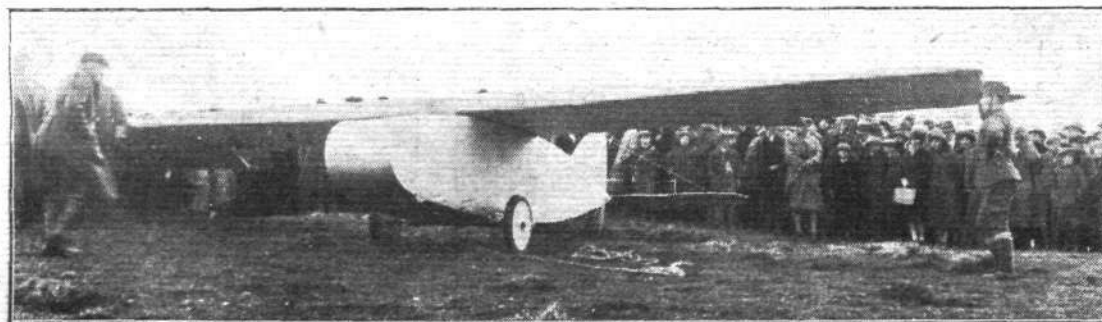
Friday, October 20.—The strong wind of yesterday died away during the night, and this morning there was but a gentle breeze, while mist hung about among the hills. Nevertheless several gliders were taken from their tent hangars at Itford to the top of Firle Beacon. As it was quite obvious that the wind was insufficient for soaring, at least by any of the gliders which had been tested up till then, no flights were attempted until, shortly before 1 p.m., Stocken had his "Airdisco" monoplane Phi-Phi placed on the brow of the hill and made a start. This machine, designed by Major Grant and Mr. Rankin, and built by the Aircraft Disposal Co., is a parasol monoplane with crescent-shaped wings. Originally it was fitted with two small wheels, but on a short trial flight these gave trouble and were replaced by a couple of aeroplane tail-skids. At the first attempt today the skids appeared to dig into the ground too much, and the machine could not be got off. A pair of small wheels were then fitted on the skids, and this time the machine got away after a very short run, hanging in the air for quite a long time. At first Stocken turned towards the left, *i.e.*, towards Itford, travelling down wind, but he then made a right-hand turn. The machine, however, took so long in answering the rudder that by the time the turn was completed it was out of the ascending currents, and there was nothing for it but to make a glide into the valley. The machine appeared to float along, apparently indifferent to forward speed, and nearly as indifferent to her rudder controls. However, she certainly gave the impression that with improved controllability she would soar in very light airs. Stocken's time was 3 mins. 18 secs.

As soon as Stocken had landed Mr. Olley made a start on the Fokker biplane, but, like Stocken, he lost the ascending current and had to glide into the valley, making a good landing after being in the air about 3 mins. 20 secs. During his flight Mr. Fokker caused considerable amusement by shouting repeatedly to Olley "Come 'ere, come 'ere." While waiting for the wind to get up many of the competitors and officials amused themselves by "launching" one another on cushions and pieces of fabric, the record "flight" being made by Mr. Manning, who was treacherously and suddenly left alone on a piece of fabric by the other two passengers.

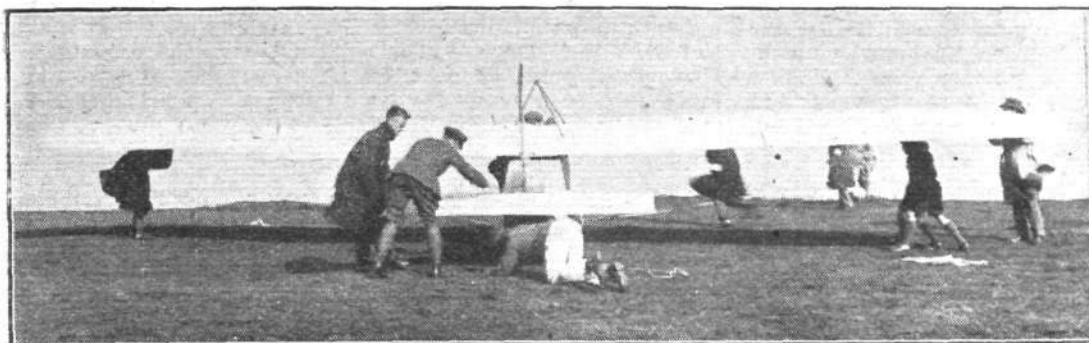
A little later in the afternoon the Fokker single-seater was got ready for a start, Fokker having very sportingly given permission for Merriam to make a flight on it. As everything was ready a heavy mist rolled up, and it was wisely decided to postpone the flight. Then followed a wait of about half-an-hour, but as there was no prospect of improvement in the weather, Raynham, England and Fokker agreed to return to camp, so that no one should have an unfair advantage over the other.

Late in the afternoon Fokker gave three demonstration flights on the single-seater, starting from Itford hill. At the end of the first two, he landed on the western slope, behind the hangars, but in the third he promised to make an attempt to land right in front of the tents, a space being cleared for him. There was a great search for a cinematographer, as Fokker would like a film of this landing, but no one seemed to be sufficiently familiar with this kind of photography, and Fokker had to do without his "pictures." He started again from Itford hill, and swung to the left as in the previous two flights, but just before getting to the barbed wire fence, he turned to the right, coming in a couple of feet off the ground. As he floated by he whistled and shouted "I cannot do it, too much speed, too much speed." He just managed to touch in front of the tents, but had to carry on down the slight slope. Nevertheless, the performance was a very pretty one.

The Sayers monoplane was ready just before dusk, and Courtney made a short flight. Control troubles had kept the machine from doing anything much, and although there was



A late-comer with a fine performance: Three-quarter front view of Sqdn.-Ldr. Gray's monoplane. This machine was made from the fuselage of a Bristol Fighter and the top plane of a Fokker D.VII, and was consequently nicknamed the "Brokker."



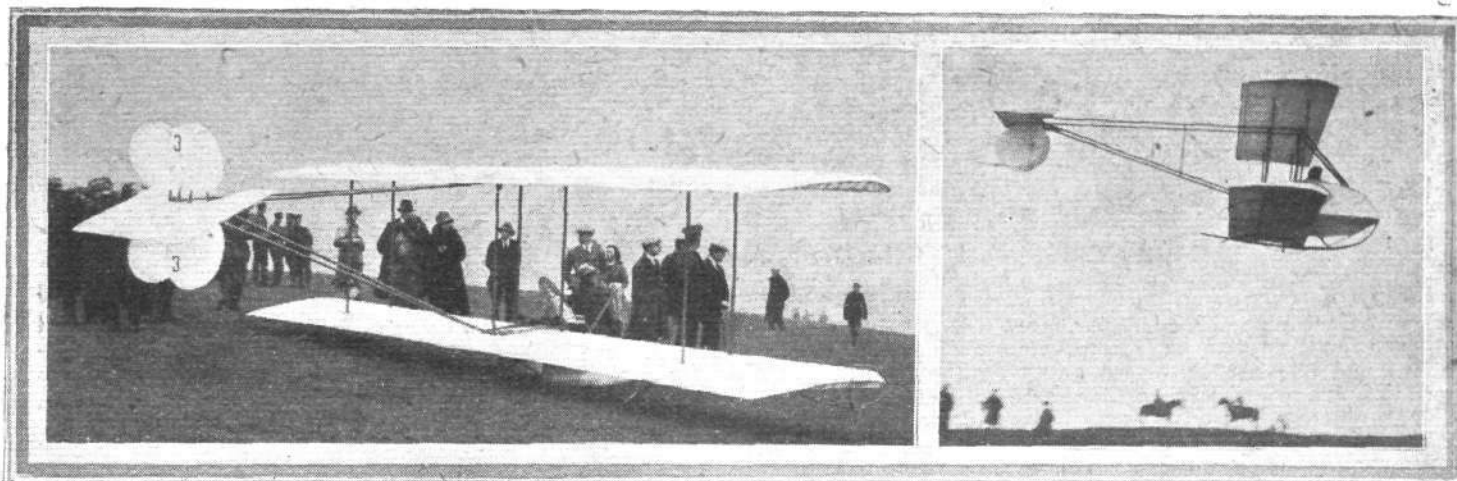
The Merriam-Newman monoplane photographed just before the start of the flight which ended in a crash.

a decided improvement, further adjustments were still considered necessary.

Saturday, October 21.—A brisk wind was blowing from the north-east on the last morning of the competition. In the early morning a pedal-propelled monoplane was being tried on Itford hill, being started from a comparatively safe height. A couple of short hops of a few feet, about one foot off the ground, was the nett result, and the inventor decided to refrain from challenging Raynham's 1 hour 53 minutes.

In the meantime Raynham had had his machine brought to the top of Firle Beacon, and made an early start. He did not, however, succeed in remaining aloft for any great length of time, landing well to the east of Firle. Gordon

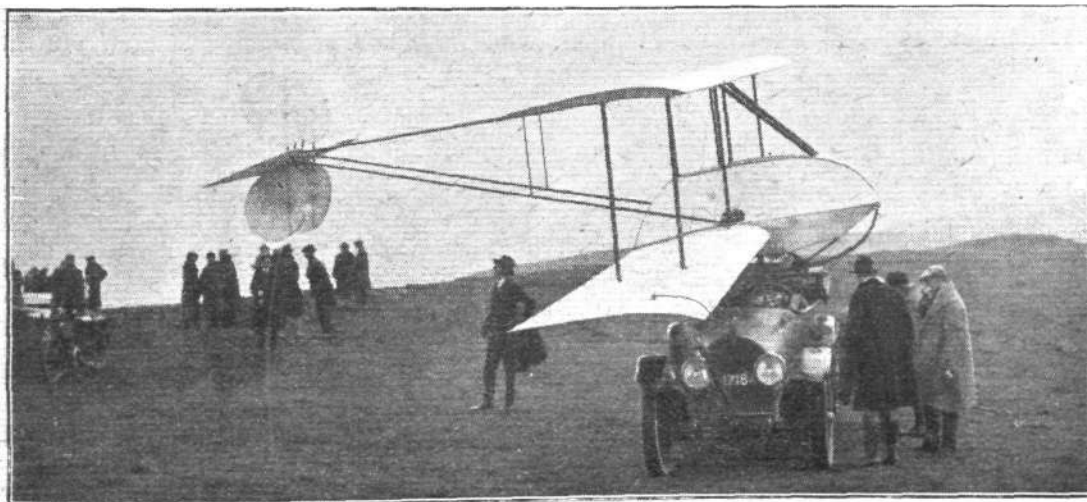
short way from the summit of Firle, and England was extricated. He was conscious, and expressed the opinion that his leg was broken. In spite of the pain, he pluckily smiled to his friends, and expressed regret that his accident should have happened just when he was doing very nicely, and was keen to know how long he had remained up. The machine was but little damaged. The extreme nose was crushed in, and much of the rest of the front portion was damaged in getting England out, but otherwise the machine had withstood the shock admirably, and the construction must certainly have been uncommonly sound to stand up as it did. No ambulance was in sight, nor had it arrived one hour after the crash. In the meantime poor England was



THE FOKKER MACHINES : On the left, the small single-seater biplane, with pilot's seat on lower wing. (On the right, the two-seater, which has an enclosed nacelle, is seen in the air, piloted by Mr. Olley. Note the central skid and wing-tip guards.

England was next to start, but when he had been up for a few minutes he got blown back over the top of the ridge. He tried to get back by making a sharp turn, but while the machine was well banked for this a gust struck it, tilting it over further and causing it to strike the ground, nose first. Assistance was rushed to the spot, which was but a

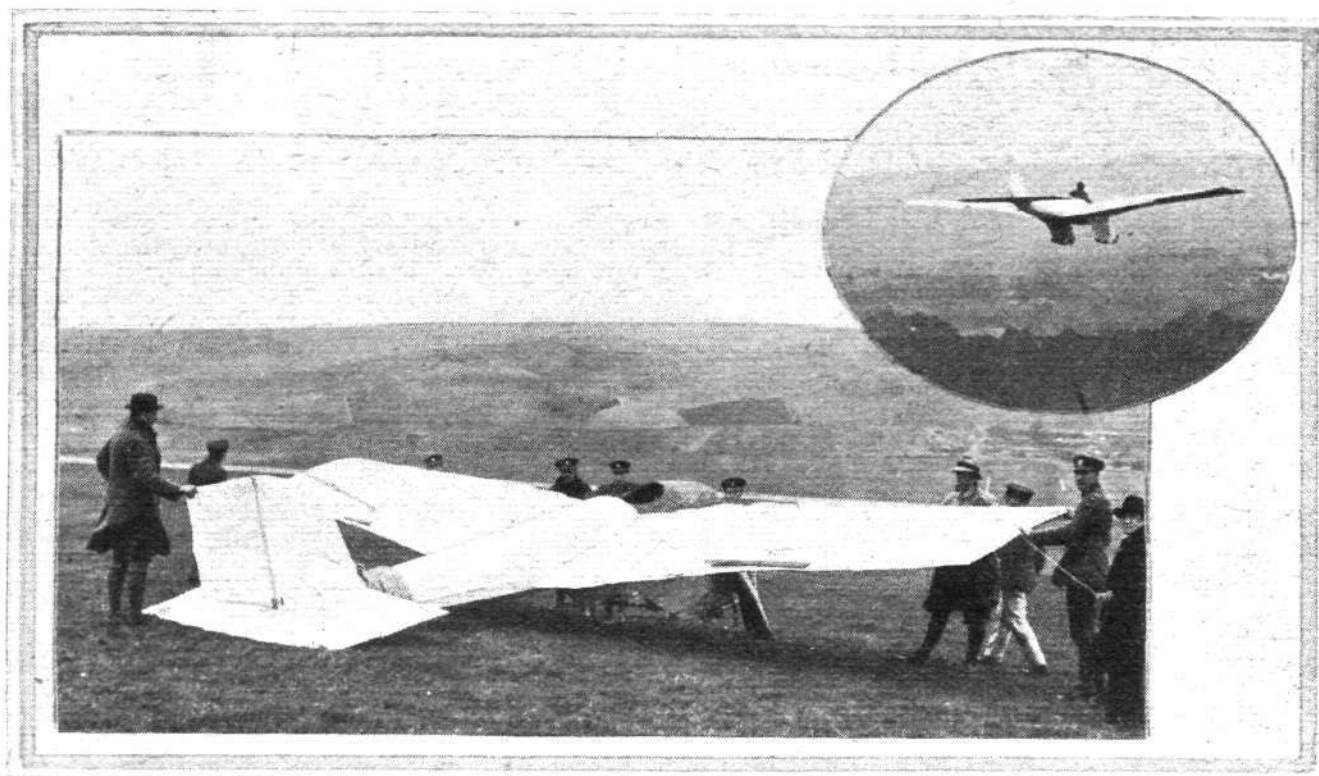
lying on the ground with a double fracture of his ankle, and some highly uncomplimentary things were said about the ambulance, which was nowhere to be found. On the previous morning it had been seen busily engaged carting flat-footed policemen up to the top of Itford Hill, but this morning it had vanished utterly and completely.



Fokker's method of transport: The biplane glider is placed on a plank resting on the sides of the car, and the machine is lightly braced fore and aft by two ropes.

The Fokker two-seater passed the scene of the crash shortly after 10, and proceeded to a point some little distance east of Firle, to a place which Gordon England had nicknamed "Fokker Point" from the preference which Fokker had shown for this spot. Here it was lifted off the car and got ready for flight, taking off about 10.40, piloted by Olley,

with a passenger. It cannot be pretended that it was pleasant to watch this flight. The machine looked as if it had St. Vitus' Dance, and one did not envy the passenger. However, it probably looked worse than it felt, otherwise it must have been agony to the occupants. In bringing the machine back to the top the plank on the car broke and the

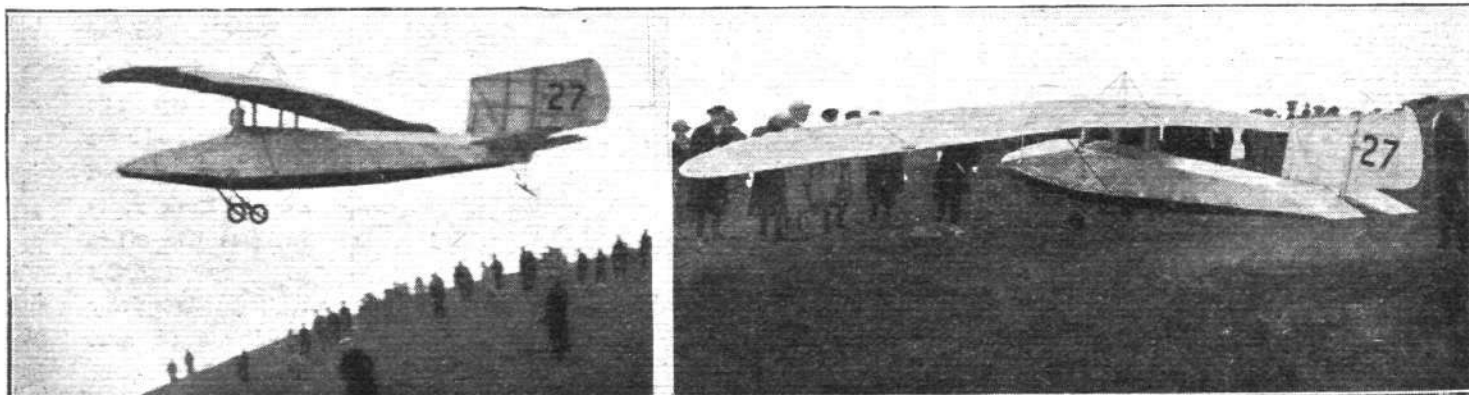


MR. JEYES' AACHEN MONOPLANE : Inset, the machine in flight.

who was accompanied by a passenger (Observation Officer Rodgers of the R.A.F.). The machine was violently blown about, and Olley had all his work cut out to manage it. The gusts struck it violently, and it rocked as it rose and fell on the air currents, the warp being in constant and violent use. On one occasion the machine got blown, while at a low altitude, towards the side of the hill, but by skilful piloting Olley managed to save a crash. Fokker kept shouting advice to him, telling him to get up higher, but either Olley could not hear or he was unable to get up very high; at any rate, the machine never reached any great height above the starting-point. For over three-quarters of an hour Olley struggled with the wind, and the general opinion was that he might carry on too long, getting exhausted and out of control. The end came with dramatic suddenness. While apparently flying well the machine must have got into a strong down-current. It disappeared from view in a flash, but when spectators ran to the edge of the hill they saw the machine gliding down into the valley under good control and land safely by a clump of trees. The duration was about 49 minutes, which constitutes a world's record for glider

glider toppled over backwards, damaging the tail. Afterwards a small Boy Scout was seen triumphantly carrying one of the rudders about and nearly taking the air in the strong wind.

Raynham had by now got his machine back to the summit of Firle, but as no other competitor appeared likely to beat his record, he decided to wait until the wind dropped a bit. A brown machine could be seen approaching from Itford along the ridge, but it seemed to take a very long time in getting to Firle. As it came closer it could be identified through field-glasses as the French Peyret monoplane. A stop was made at every little hill, and apparently Peyret and Maneyrol could not make up their minds to start from any of them. Finally, about 2 p.m. they reached Firle, and decided to make a start from there. The wind was strong and extremely gusty, but the Frenchmen had made up their minds. Most of us thought the machine would crash as soon as it got off, but about 2.30 it rose very steadily and immediately soared to a considerable height. Maneyrol at once proceeded to beat backwards and forwards along the side of the hill, going on his first "tack" as far west as



THE "AIRDISCO" MONOPLANE : On left, machine is seen taking off for a flight, piloted by Rex Stocken. On the right, a three-quarter rear view of the machine. Note the crescent-shaped wing.

Firle (he had started from "Fokker Point"), but finding the air troublesome here, he did not venture so far west again. "Tacking" backwards and forwards over quite a narrow strip, he reached much greater altitudes than had any previous competitor, and it was obvious that the machine was under perfect control the whole time. Not only so, but never did the pilot appear to use more than a small fraction of the control available. It was also noticed that in the gusts he did what no other competitor had done; he climbed with the nose well up. Other pilots had floated up on the currents, but with the noses of their machines well down. Altogether the flight of the Peyret resembled that of a bird, and after the first few minutes one never felt any doubt that the machine was making light of the wind. Every now and then it would hover, with its nose to the wind. Sometimes the wind would drop, and the machine began to glide forward, the pilot then resuming his "tacking." At other times the wind would blow it backwards slightly, but by diving Maneyrol got it away from the hill, apparently without an effort.

When Raynham saw how well the Peyret monoplane was handled he made a start from Firle, slightly to the west of the Frenchman's "beat," but, good sportsman that he is, he chose to go west towards Itford, so as not to interfere with Maneyrol. He disappeared behind Beddingham hill, going down wind but keeping his height well. It was afterwards learned that he had reached Itford, turned back, but "lost his wind" and had to land near the foot of Beddingham hill, having been in the air some eight minutes.

At Firle M. Maneyrol continued his ceaseless beating to and fro. When he was within ten minutes or so of beating Raynham's time a shower fell, and in the disturbed air Maneyrol had all his work cut out to remain up, having to "tack" much more frequently than hitherto. For a few minutes it looked as if he was going to be forced down without having beaten Raynham, but when the shower had passed the wind got up again and the Peyret soared to a greater height, where the air appeared to be much more steady.

The Joke of the Meeting

While the shower and clouds were making things uncomfortable for the French pilot, Sqdn.-Ldr. Gray's machine was brought to Firle and got ready. This machine had arrived during the morning, and did not look particularly impressive. It was learned that the machine had cost the fabulous sum of 18s. 6d. to build, of which 5s. bought the Bristol fuselage, another 5s. the Fokker D.VII top plane wing, the rest being spent on dope. The machine was fitted

with wheels, which, however, were left behind as it took off. At the first attempt the "Brokker" came down after a "flight" of two seconds. A second attempt was more successful, and to the amazement of every one the "Brokker" soared into the air majestically, turning to the right towards Bostal Hill, climbing well and appearing to be under perfect control. Sqdn.-Ldr. Gray took up a "beat" to the east of that used by Maneyrol, and the two machines swung backwards and forwards, sometimes meeting at the end of their beats, when the pilots would wave to one another, and sometimes swing to right and left in perfect synchronisation. It was a wonderful sight, and the "Brokker" caused great admiration owing to its extremely steady flight and perfect controllability. There was a great difference between the two machines. The Peyret was quick on the controls and rapid in its manoeuvres. The "Brokker" was slow and stately, looking like a Blimp that had grown wings.

Suddenly a great cheer went up, when Maneyrol had reached Raynham's time of 1 hour 53 minutes. The Frenchman waved acknowledgment, and proceeded in an attempt to beat the German duration record. The two machines were by now mere silhouettes in the sky, and as the minutes went they got dimmer and dimmer. Finally it was decided to make arrangements for lighting up the top of the ridge with motor-car lamps, and a space was cleared for the two machines to land on. When cheering and hooting of motor horns announced that the German record had been equalled Maneyrol came down low and shouted that he would land in a few minutes. He stayed up another 20 minutes or so, and finally both he and Squadron-Leader Gray made perfect landings, on the summit of the ridge, about 100 yards from their starting point.

Maneyrol's time was given as 3 hours 21 minutes 7 seconds. But for the darkness there was no reason why he should not have stayed up for several hours. Gray had been up about 1½ hours, a very wonderful performance.

During the afternoon Stocken attempted a flight on "Phi-Phi," but crashed, without injuring himself fortunately.

In the evening there was a dinner at Seaford, where the prizes were presented.

The *Daily Mail* Prize of £1,000 was won by Maneyrol. Royal Aero Club's £50 Prize won by Squadron-Leader Gray. Lieut.-Col. Ogilvie's Prize of £50 won by Raynham. The Seaford Chamber of Commerce £20 for longest aggregate time in the air won by Olley, and longest straight flight by Raynham was rewarded by a prize of £10. Mrs. C. G. Grey's Prize of £10 awarded to Gordon England, and Col. Bristow's Cup to Rex Stocken.



Married

Capt. ALASTAIR C. BOLTON, M.C., late R.S.F. and R.F.C., only son of Mr. and Mrs. F. C. Bolton, of Aberfoyle, Perthshire, was married on September 11, at St. Andrew's Church, Livingstone, N. Rhodesia, to DOROTHY E. ANSTEY (DOSHIE), widow of Sqdn. Ldr. Chisholm W. Anstey, S.W.B. and R.A.F., and eldest daughter of the late Col. H. R. Westmacott, the Welch Regt. and Mrs. Westmacott, of 2, Millfield, Folkestone.

WALTER HOLCROFT CAM, M.B., B.Ch., late M.O. i/c XI. Wing, R.A.F., was married on October 19 at Paulerspury, to RUTH, widow of Major GERALD JAMIESON, Indian Army, daughter of the late Rev. Frank Cobbold.

To be Married

A marriage has been arranged, and will take place on December 1, between CLEMENT HUGH GRESWELL, only son of the late LEONARD GRESWELL, of Alveston Grange, Gloucestershire, and Mrs. Caversham Simonds, of Wellesbourne Hall, Warwickshire, and VIOLET CONSTANCE MOORE, daughter of the late Capt. G. H. Moore, R.N., and the late Mrs. Moore, formerly of Camden Hill, Cranbrook.

Killed

Flight Lieut. ROBERT CHARLES LYON HOLME, M.C., R.A.F., late of the 1st Somerset L.I., who died on October 4 at Kirkuk, Mesopotamia, as the result of an aeroplane accident,

in his 26th year, was the only son of the late Robert Francis Lyon Holme, and grandson of the late Charles Trask, of Norton-sub-Hamdon, Somerset.

Death

Flying Officer BASIL ARTHUR FOORD, R.A.F., M.C., D.F.C., who died on October 18 at the Central R.A.F. Hospital, Finchley, aged 25, was the youngest and last surviving son of the late J. A. Foord of Fort Jameson, Northern Rhodesia.

Item.

LIEUT.-COL. RONALD WATERHOUSE, C.B., C.M.G., by permission of the Duke of York, is relinquishing his present appointment as Private Secretary and Equerry to His Royal Highness, in order that he may take up the position of Principal Private Secretary to the Prime Minister. Lieut.-Col. Waterhouse acted in a similar capacity when Mr. Bonar Law was Leader of the House of Commons.

Colonel Waterhouse, who was born in 1878 and educated at Marlborough and Oxford, was in the 6th Dragoon Guards and the R.A.F. His War service comprises Mashonaland, 1896-7, the South African War (six clasps), and the European War (C.M.G. and "mentioned"). He was formerly private secretary to the Chief of the Air Staff and to the Controller-General of Civil Aviation. Last year he received the C.B.

LONDON TERMINAL AERODROME

Monday evening, October 23.

THE first internal "airway" in Britain, between London and Manchester, was inaugurated today by the Daimler Airway, and, judging by the bookings already made, it promises to be a success. The machine left Manchester at 10 a.m. and arrived at Croydon 1 hour, 56 minutes later with eight passengers, two of whom were travelling on to Amsterdam by air. The others were business men who had urgent business in London, and were sampling the new super-express method of travel. One of them was a Manchester member of Parliament, *en route* to a political meeting at the Hotel Cecil, and it would appear that this air route will attract real business travellers as contrasted with the pleasure traffic of the London-Paris line.

The machine from Amsterdam left at 9.50 a.m. and arrived at Croydon at 12.5 p.m. This machine also carried eight passengers, which was very encouraging on a first trip. The bustle at Croydon, with two machines arriving within a few minutes of one another, and two more starting away again within three-quarters of an hour of the two arrivals, will no doubt become more orderly and smooth-running as the officials get used to it. As it was, the machines got away in reasonably good time, considering it was the first day's running.

Important Arrivals at the Air-Station

M. FLANDIN and M. Laurent Eynac arrived at the air-station this afternoon in one of the Grands Express Company's "Goliaths." They are here to attend the International Commission on Air Navigation, which will discuss the problem of the air services into Germany.

On Friday the wind had dropped, and was replaced by a thick mist, with accompanying low clouds, and, in consequence, the air services were held up almost entirely. The only machine to get through was one of the K.L.M. monoplanes, piloted by Mr. Van Der Hoop, who left Croydon early in the afternoon and—although the rest of the pilots shook their heads and talked of suicide—arrived safely at Rotterdam. A Goliath of the Grands Express was the only other machine to start, and this, after flying from Paris to Lympe, abandoned the journey till next day.

The Instone Air Line cancelled their service to Brussels and Cologne on Thursday, owing to the high wind, which, being dead against them, would have made the journey exceptionally long, and would have been risky with the present limited fuel capacity. I understand, in this regard, that both the Instone and Daimler 34's are to have larger petrol-tanks fitted.

Bad-Weather Flying Across Europe

MR. ALAN J. COBHAM, who has been engaged on an "air-taxi" flight across Europe to Constantinople, arrived back at the air-station on Sunday at 11.40 a.m. He tells me that the weather throughout his flight has been awful. In fact, it is quite the worst flight he has ever made. It was

impossible to fly direct across country, and he had to follow the windings of the rivers, often flying at a height of only 50 ft. above the water. Although the direct flight to Constantinople, and return, is about 3,200 miles Mr. Cobham had flown 5,000 miles by the time he arrived at the air-station, owing to the detours he was compelled to make to avoid the bad weather. His actual flying time from Constantinople to London was only 23 hours, and he covered the 290-miles stretch from Cologne to Lympe in a non-stop flight of two hours.

The second annual aerodrome dinner and smoking concert is to take place on November 6 at the Greyhound Hotel, Croydon. Maj.-Gen. Sir W. S. Brancker, the Director of Civil Aviation, is to take the chair, and, according to Mr. Coleman, who has organised the affair, the tickets are selling well, and everything points to a successful and pleasant evening.

During the week the Daimler 34, G-EBBS—which, by the way, has now flown something like 90,000 miles, and is still considered one of the best machines in commission—was flown to Manchester with Mr. Hinchliffe in the pilot's seat, and Col. Searle and Maj. Woods-Humpreys as passengers. I understand that they took the opportunity of alighting at the Coventry aerodrome, which adjoins the Daimler works, and thus gave the Coventry people an opportunity of inspecting the latest Daimler enterprise. The machine remained at Manchester to inaugurate the Manchester-London service this morning.

High winds have interfered with the regularity of the services during the week. Some exceptionally rapid trips have been made from Cologne and Rotterdam, but, on the other hand, the journeys to these places have, to say the least, been protracted. Mr. Holmes piloted one of the Napier-engined 34's of the Instone Air Line from Cologne to London in 2 hours 39 minutes, while on a flight from Rotterdam to London on a Daimler 34 Mr. Hinchliffe was only 1 hour 37 minutes from aerodrome to aerodrome. On the outward journey to Rotterdam the same day, the machine had to descend at Flushing for a further supply of petrol at the end of 3 hours and 5 minutes' flying.

On the same day, with a wind that was blowing at over 50 miles-an-hour above the Channel, a woman invalid, who was too ill to make the boat-and-train journey, was flown from Paris to London by the Daimler machine—which was returning after having taken newspapers to Paris. She expressed great satisfaction with her journey, and, in spite of the gale, suffered no ill-effects.

The chairman and secretary of the Manchester Chamber of Commerce were at the aerodrome on Friday, inspecting the Daimler organisation, in order to report to their members as to the arrangements made to provide Manchester with an efficient air-service. They spoke to the Manchester aerodrome by wireless, and were much impressed by the thoroughness of the Daimler methods of running an aeroplane service.

THE LONDON-CONTINENTAL SERVICES FLIGHTS BETWEEN OCTOBER 8 AND OCTOBER 21, INCLUSIVE

Route†	No. of flights*	No. of passengers	No. of flights carrying		No. of journeys completed†	Average flying time	Fastest time made by	Type and (in brackets) Number of each type flying
			Mails	Goods				
Croydon-Paris	61	183	19	52	57	h. m. 3 9	H.P.W.8B G-EAPJ (2h. 8m.)	B. (6), D.H. 9 (1), D.H. 34 (2), G. (9), H.P.W.8B (4), Sp. (2).
Paris-Croydon	62	227	17	45	57	2 40	D.H. 34 G-EBBQ (1h. 44m.)	B. (6), D.H. 9 (1), D.H. 16 (1), D.H. 34 (2), G. (11), H.P.W.8B (4), Sp. (2).
Croydon-Brussels-Cologne	14	93	—	—	14	4 40	D.H. 34 G-EBBT (4h. 13m.)	D.H. 9 (1), D.H. 34 (3), D.H. 37 (1).
Cologne-Brussels-Croydon	11	73	—	—	11	4 7	D.H. 34 G-EBBT (3h. 29m.)	D.H. 9 (1), D.H. 34 (3).
Croydon-Rotterdam	23	37	23	23	23	2 57	D.H. 34 G-EBBS (2h. 10m.)	D.H. 34 (3), F. (8).
Rotterdam-Croydon	22	41	19	18	22	2 15	D.H. 34 G-EBBS (1h. 56m.)	D.H. 34 (3), F. (8).
Total for 2 weeks	193	654	78	138	184			

* Not including "private" flights.

† Including certain journeys when stops were made *en route*.

‡ Including certain diverted journeys.

Incidental Flying.—Messrs. Hayns, Perry and Piercey have been testing various machines (including Avro, D.H. 9, Martinsyde and Sopwith Snipe) at Croydon for the Aircraft Disposal Co., and each flew a Martinsyde over to Dublin on the 12th.

FROM THE AIRISMS FOUR WINGS.

WITH the political upheaval now in full blast, the air will have its share of new currents. That the new Government will revive the fatal error of combining the Secretaryships of War and Air is unthinkable. For office under the new régime, with Lord Londonderry ruled out, very live men are to be found in Sir William Joynson-Hicks and Col. Moore-Brabazon, who are well calculated to see to the requirements in their respective spheres of such leaders as Air Chief Marshal Sir H. M. Trenchard and General Sir Sefton Brancker.

SIR WILLIAM is pardonably an enthusiastic air development advocate. He is Imperialistic in his views, and he is right. Speaking only the other day at Leeds, he asked during an address upon "An Imperial Air Service":—"What, however, of the future?" His view was that it was almost impossible by prophesying to keep ahead of realisation. The improvements, the developments, the inventions which had taken place in the last ten years, particularly even in the last five years, would be exceeded in the next five. It was a certainty that within the next ten years 200 miles an hour would be a common speed, and that flying the Atlantic would be not merely a heroic performance, but an everyday operation. Just as the last century was the century of railways and the beginning of the present century was the era of motor-cars, so the middle of this century would see—even with the development of our present engine and our present plane—the era of aviation, but beyond that he saw no reason to suppose that new types and new inventions might not be produced which would completely put in the shade even the marvellous productions of the present day.

LAST week a paragraph attributed the defrayment of the cost of the "R.38" memorial at Hull to the generosity of the Air Ministry. All a mistake, and only an "imagination" of the correspondent who supplied the item. The entire cost is being met by private subscription, but, needless to say, the scheme has the approval and moral support of the Ministry.

BEATEN at last! In the following characteristic little note Mr. L. M. Braund, of the Robinhood Engineering Works,

the makers of those wonderful "K.L.G." sparking plugs, strikes a new note:—

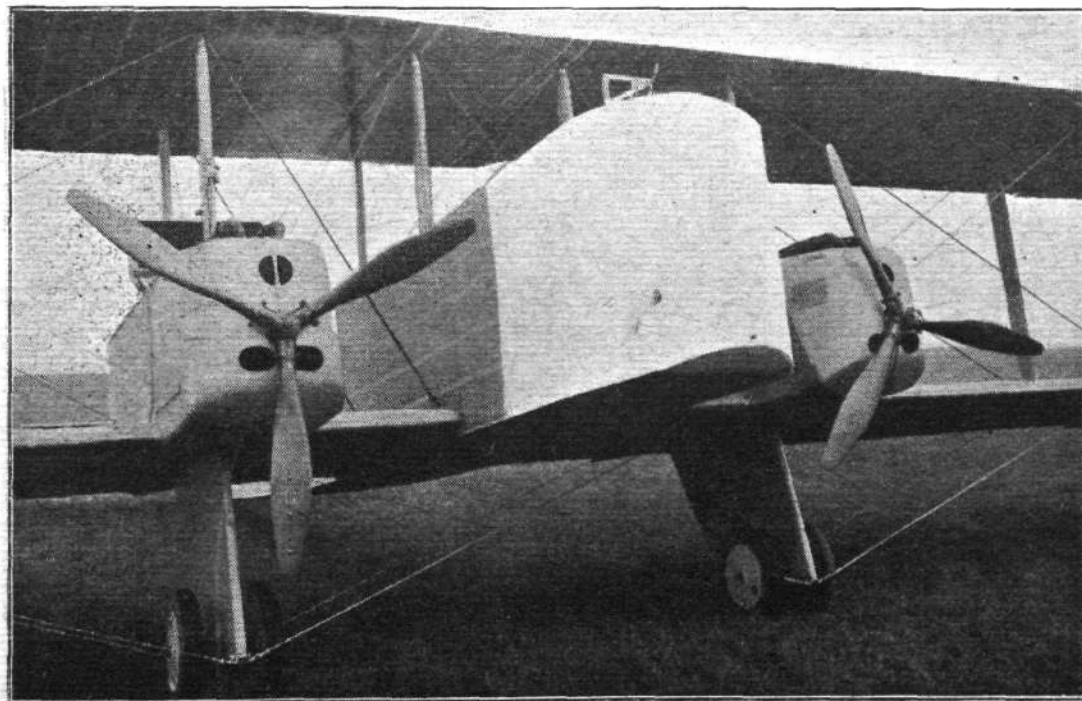
"The 'Daily Mail' Gliding Competition.

"We regret to inform you that for the first time in the history of aviation, a notable performance has been achieved in the air without the use of 'K.L.G.' sparking plugs."

SEVERAL years ago we have detailed the wonderful possibilities of Prague as an important central point for aviation. General Brancker has also advanced views upon the subject from the report of his recent visit to that city. That Prague will form an important link in our Imperial air-chain is almost beyond question. Outside France and ourselves, Czecho-Slovakia has probably the most ambitious notions in regard to commercial aeronautics.

THAT Gibraltar might lend itself to adaptation as a great centre of aviation has been in the wind for some time. According to the Spanish review, *Alas*, via a correspondent of the *Matin*, the idea is to materialise and the "rock" transformed into a vast subterranean flying station, opening up visions of the craft coming home like huge pigeons to their "nests" on the ledges. In the centre of the rock, the *Alas* writer states, will be built a great square, whence tunnels will lead in all directions. There are to be several floors, connected by monster lifts. To enable aeroplanes to start and return a large tipping-up platform will be placed at the entrance to each tunnel. The scheme, the correspondent continues, will make it possible to shelter inside the rock the most important aerial fleet in the world. Thus Gibraltar recovers its former strategic importance.

CURIOUS how dense some authorities are in imagination when any new era arises, thus putting back their chances of being in the front of a new movement, for the sake of a little speculative enterprise. From Melbourne it is now reported that owing to the Government's immediate want of aeroplane supplies the Cabinet has decided that it is unable to place orders with the recently-formed Australian Aeroplane Manufacturing Co. The latter therefore, it is stated, contemplates closing down, private demands not justifying the maintenance of the plant.



The Farman "Goliath" upon which Bossou-trot made his record flight, as recorded last week in "Flight." Note the pair of Leitner - Watts 3-bladed metal air-screws which helped the French machine to victory. Moreover, these nine-foot propellers are entirely British, being designed by Mr. Watts, and manufactured for the Metal Air-Screw Co., Ltd., at Messrs. Rubery Owen's well-known works.

THE CASE FOR METAL CONSTRUCTION *

By JOHN D. NORTH (Fellow)

ALTHOUGH I have been requested by the Council of this Society to read a paper on the metal construction of aeroplanes, there are two phases of the subject with which I do not feel prepared to deal. In the first instance, any paper dealing historically with this matter is likely to give rise to controversy which is of neither scientific nor engineering interest, and I propose to leave this aspect severely alone. Secondly, I do not pretend to expound a process of design. The technique of this new branch of the engineering art is still too fluid; while so far as experimental results are concerned, it is probable that more have been published than have been digested.

The aeroplane engineer, designer, constructor or user, not unnaturally, is inclined to pin his faith to the system of composite construction, which, brought to a state of high perfection, he has found to serve him well in the past. All the history of engineering relates the gradual displacement of timber by lighter and more durable structures of steel, but such a transition in aeroplanes he feels is difficult, if not impossible, to realise with advantage. Of the three separate metal aeroplane movements in Great Britain, Germany and France, that in this country, at least, received its principal impulse, not from a realisation of the great engineering advantages attending it, but from the pressure of a world shortage of the limited supplies of that class of timber most suitable for light structural purposes.

The cessation of the demand for the mass production of aircraft, coincident with the termination of hostilities, deprived the movement of its principal motive power, but not before it had been realised in some quarters that metal, and particularly steel, construction, could succeed on its own merits even in competition with a normal timber supply.

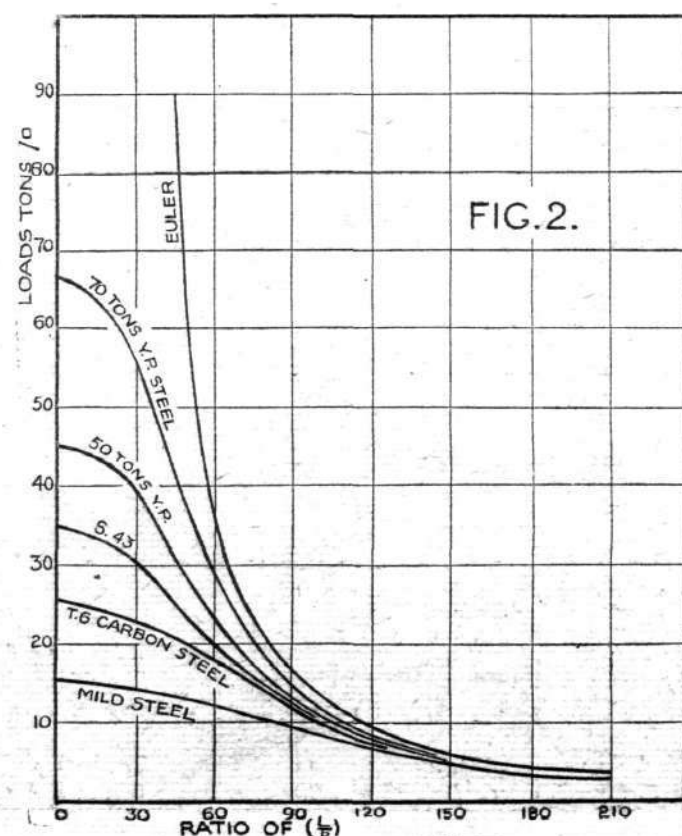
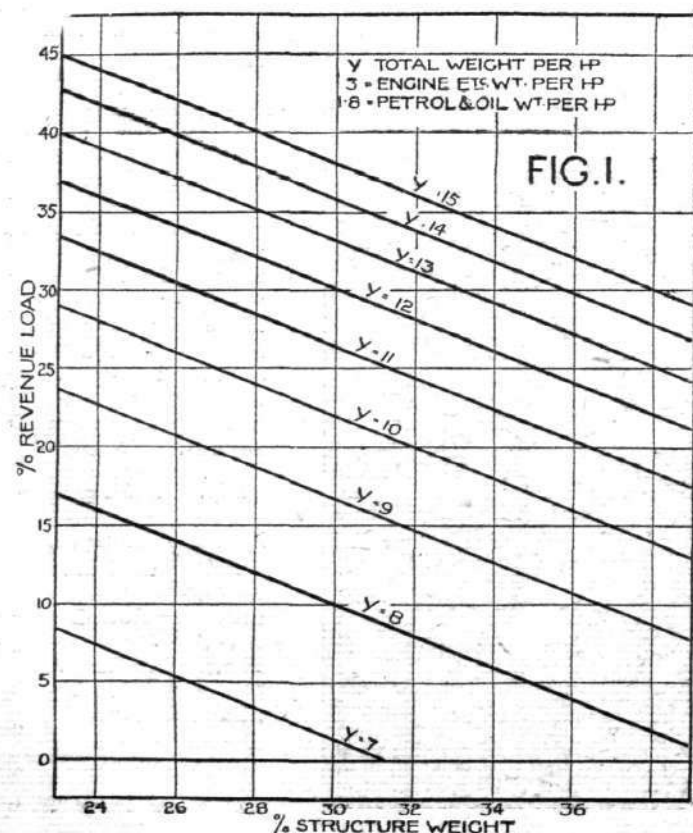
It may be helpful first to note some general criticisms of metal construction.

The principal argument which has been advanced is that metal construction has not demonstrated its advantages over the usual composite form of structure. This is not, strictly speaking, a sound criticism, being in the nature of an *argumentum ad ignorantiam*, and though it is quite true that in most cases the users of this argument have not had the necessary experience of metal construction to enable them to appreciate it, such an argument cannot be considered as conclusive. It may be inferred from various remarks that in the opinion of critics metal construction is expensive, perhaps heavier and, in temperate climates at least, not likely to be more durable than wood. It has further been criticised by

analogy on the grounds that small motor-boats are invariably, or at least most successfully, constructed of timber, and in some cases it has been further put forward that metal construction must be associated with large aircraft just as it is associated with large ships. The weakness of this argument is immediately apparent when we consider that the first object of a boat is to keep out water, and the adverse experience of constructors of steel motor-boats is almost entirely due to the fact that it is difficult to make them watertight. These conditions are not analogous to those obtaining in aircraft, and it hardly seems necessary to pursue the argument further. With regard to the other criticisms, I hope to indicate in these notes that the following advantages may be obtained by the use of metal construction:—

- (1) Retrenchment of weight.
- (2) Improvement in the reliability of materials.
- (3) A longer life, particularly under conditions of storage.
- (4) A better resistance to adverse climatical conditions.
- (5) An improvement in bulk manufacturing facilities.
- (6) A reduction in some risks and effects of fire.

It is, I think, not always sufficiently realised what a very important effect comparatively small differences in the structure weight of an aeroplane have upon its general characteristics; particularly is this the case when the aeroplane is designed for a high performance or a very long range of flight. There has been some little tendency, and designers of equipment seem to be special offenders in this respect, to imagine that a few pounds here and a few there are negligible in regard to the gross weight of the aeroplane, and that special efforts to economise weight are therefore not necessary. If it is realised that the margin available for military load per unit horse-power is only the remainder after deducting the structure, the engine, installation and fuel weights, it will be appreciated that a saving in weight in an individual part is reflected in an economy on the gross weight, greater by the ratio of the gross weight to the military or revenue load. This is illustrated in Fig. 1, which shows the variation of revenue load—the revenue load in this instance includes pilot, instruments, equipment, etc., so that the influence of structure weight on revenue load is enhanced, particularly in the case of small aeroplanes—or military load with different percentages of structure weight for aeroplanes having various classes of performance. The variations in performance have been indicated by the power loading in pounds per horse-power, since this figure conveys in a simple manner the typical performance, to the aeronautical engineer. It will be noticed that even with a power loading of 15, which is representative



* Paper read before the Royal Aeronautical Society on October 19, 1922.

of most modern commercial aeroplanes, a reduction of structure weight from 34 per cent. to 26 per cent. increases the revenue load from 34 per cent. to 42 per cent., an increase of nearly 25 per cent. in the utility of the aeroplane. In the case of the high performance aeroplane, the increase will be seen to be vastly greater, and in many cases makes possible a type of aeroplane which will be placed out of court with the heavier structure weight. I have every reason to believe that the structure weight of aircraft can be reduced from an average of 33 per cent. to an average of 25 per cent. to 27 per cent. by the use of metal construction, an advantage which, while extremely beneficial for commercial aeroplanes, is absolutely imperative in the case of military machines. I do not suggest that the whole of this gain can be obtained at once, but theoretical considerations and practical experience both indicate that there is a reasonable probability of arriving at such a figure at no very distant date, provided experiment on broad lines is continued unhampered by the necessity of obtaining immediate results from experimental expenditure.

Let us consider how this retrenchment of weight is to be accomplished. It can be shown from first principles that it is possible to make structural members of metal considerably lighter than of timber, and this has been borne out by practical experience. There are two physical properties of structural materials which are of first order of importance in considering the weight of the structure manufactured from them. Firstly, the ratio of the modulus of elasticity to the specific gravity, and secondly, the manner in which this ratio falls off with increase of stress intensity. This latter property is generally considered by focussing the attention upon the yield point of the material at which, in the ordinary normalised carbon steels, a critical change in the value of E occurs. In the case of timber, which is a vegetable growth itself of complex structure, it is only possible to discuss the change of elasticity with stress in reference to a similar critical case, and indeed since the cause of failure in light compression members of wood and metal is somewhat dissimilar, the difficulty of an exact comparison is enhanced. The following table summarises the elastic moduli of a number of materials, either most commonly used in aircraft construction or by reason of their properties most suitable. In the last column of the table these values have been made specific by dividing them by the specific gravity of the material, and from this it will

Material.	"E" (tons/sq. in.).	Specific Gravity.	E/Sp. Gr.
Spruce (Spec. 2 V.1)	670	0.45	1,490
Steel	13,000	7.8	1,667
Duralumin alum. alloy (Spec. 2 L. 3)	4,790	2.85	1,680
Magnesium alloys ..	2,400	1.75	1,370

be seen that in the case of these materials there is very little to choose between them, though metal is at some advantage.

If we were to imagine that the structure of an aeroplane were composed entirely of "Euler" struts, in which the modulus of elasticity would be the only property of the material of importance, it would be apparent that that form of construction, which would give us members with the greatest radii of gyration, would give us the lightest structure. The second table furnishes the critical stress which will be obtained in the outer compression fibres of a strut or a beam, at failure. This stress is again made specific by dividing by the specific gravity of the material, and in this case it is found that there are marked differences between the various types of material showing an advantage for certain of the light alloys over timber, and of certain classes of steels over both. If an aeroplane were constructed entirely of short struts failing in pure compression and of ties failing in pure tension, it is obvious that, supposing the other physical properties of the material to be suitable, the greatest advantage could be obtained by using the material having the highest critical stress, so far as compression failures were concerned, and the highest ultimate stress so far as the tension members were concerned. These maxima are usually to be found in the same material. In making these statements, it is postulated that the design of the member is such as to enable the critical stress to be realised. In other words, for the purpose of our argument, this stress is the critical stress by definition, and the circumstances under which it can be realised will be discussed later. We can now consider the properties of the materials in a more general way.

Fig. 2 shows the ratio of the intensity of load to the free-length radius of gyration of struts manufactured from materials of different critical stress. This figure will be familiar to most as representative of the characteristic curves of Mr. Southwell and Prof. Robertson. The first inspection of this figure will show that in order to realise the advantage of materials having a high critical stress, it is necessary that the ratio of l/k should be kept as low as possible.

It is at this point that the principal structural characteristic of the aeroplane exercises an important influence. The aeroplane is a very large structure for its weight, which means that struts with a low l/k must have very thin walls where they are made of dense material, such as steel, or, in a lesser degree, aluminium and its alloys.

It is a well-known experimental fact that, where the thickness of the wall is small compared with the radius of curvature and the length of the arc, the intensity of load indicated in Fig. 2 is not realised owing to the crinkling or buckling of the shell at a stress less than that which has been assumed as the critical stress. The lightest strut, therefore, will be that one in which the compromise between low l/k and high critical stress is best effected.
(To be concluded.)

THE ROYAL AIR FORCE

London Gazette, October 17, 1922

General Duties Branch

Flight Lieut. H. H. James is granted a permanent commn., retaining present substantive rank and seny.; Sept. 16, 1919 (*Gazette* Sept. 16, 1919, appointing him to short service commn., is cancelled).

Medical Branch

The follg. are granted short service commns. as Flight Lieuts., with effect

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

Air Vice-Marshal: Sir J. M. Salmond, K.C.B., C.M.G., C.V.O., D.S.O., from Headquarters, Inland Area, to command Royal Air Force, Iraq. 1.10.22.

Wing Commander: D. L. Allen, A.F.C., from R.A.F. Depot (Inland Area), to command Headquarters, Constantinople Wing. 28.9.22.

Squadron Leaders: H. J. Down, from Headquarters, Coastal Area, to Headquarters, Constantinople Wing (Supernumerary) 5.10.22. J. Rylands, from No. 1 Stores Depot, to Headquarters, Constantinople Wing. 5.10.22. A. J. O. Wigmore, M.B., from No. 14 Squadron (Middle East) to Palestine Wing Headquarters (Middle East). 11.8.22. G. Blatherwick, from School of Photography (Inland Area), to No. 1 School of Technical Training (Boys) (Halton). (Supernumerary.) 16.10.22.

Flight Lieutenants: F. J. Cooke from Headquarters, R.A.F., Iraq, to R.A.F. Depot (Inland Area) (Supernumerary). 20.8.22. J. C. Smyth, from Aircraft Depot (India) to R.A.F. Depot (Inland Area) (Supernumerary). 21.6.22. G. H. H. Maxwell, M.B., from R.A.F. Depot (Inland Area) to Headquarters, R.A.F. (Middle East) (Supernumerary). 16.9.22. A. E. Jenkins, from No. 1 Flying Training School (Inland Area) to R.A.F. Depot (Inland Area). 26.9.22. J. R. Crolius, M.B., from No. 4 Squadron (Inland Area) to R.A.F. Depot (Inland Area). 21.9.22. T. McClurkin, M.B., from Research Laboratory and Medical Officers' School of Instruction (Coastal Area) to R.A.F. Depot (Inland Area). 25.9.22. G. S. Ware, M.B., from Research Laboratory and Medical Officers' School of Instruction (Coastal Area) to R.A.F. Depot (Inland Area). 25.9.22. E. B. Mason. The notification which appeared in R.A.F. Intelligence, No. 77,

from, and with seny. of, the dates indicated:—F. E. Johnson; Sept. 30. R. G. J. McCullagh; Oct. 4.

Chaplains' Branch

The Rev. J. G. Stephens is granted short service commn., with relative rank of Squadron Leader; Sept. 12.

Memorandum

Lieut. S. V. Towers relinquishes temp. commn. on ceasing to be empld., and is permitted to retain rank; Oct. 8.

dated 5.9.22, wherein this Officer was posted from No. 25 Squadron to School of Photography, with effect from 25.9.22, is hereby cancelled. J. S. T. Fall, D.S.C., A.F.C., from Marine and Armament Experimental Establishment (Coastal Area), to No. 56 Squadron (Inland Area). 1.11.22. J. McGowan Glen, M.C., from No. 4 Squadron (Inland Area) to R.A.F. Depot. (Supernumerary.) 26.9.22; and from R.A.F. Depot (Inland Area) to No. 5 Flying Training School (Inland Area). 16.10.22, for duty as Adjutant. J. Duminy, from R.A.F. Depot (Inland Area) to Headquarters (Coastal Area). 16.10.22. C. P. Barber, from R.A.F. Depot (Inland Area) to Armament and Gunnery School (Inland Area). 16.10.22. A. Durston, A.F.C., from Headquarters, R.A.F. (Mediterranean), to H.M.S. "Argus" (Coastal Area). (Supernumerary.) 23.9.22. J. A. Sadler, from No. 267 Squadron (Mediterranean) to H.M.S. "Argus" (Coastal Area). (Supernumerary.) 23.9.22. J. H. Hagon, from School of Photography (Inland Area) to R.A.F. Base (Leuchars) (Coastal Area). 16.10.22. W. R. Curtis from No. 267 Squadron (Mediterranean), to H.M.S. "Argus" (Coastal Area). (Supernumerary.) 23.9.22. J. K. Ritchie Landells, M.B., from No. 2 Squadron (No. 12 Wing, Ireland) to Headquarters (No. 12 Wing, Ireland). 4.10.22. T. McClurkin, M.B., from No. 2 Squadron (Inland Area) to Research Laboratory and Medical Officers' School of Instruction (Coastal Area). 11.10.22. P. Huskinson, M.C., from Boys' Wing (Cranwell) to R.A.F. Cadet College (Flying Wing) (Cranwell). 9.10.22. A. W. Mylne, from R.A.F. Cadet College (Flying Wing) (Cranwell) to R.A.F. Cadet College (Ground Wing) (Cranwell). 9.10.22. R. B. Waite, M.B.E., from Headquarters, Inland Area, to Air Ministry (Director of Personnel). 9.10.22. A. W. Symington, M.C., from R.A.F. Depot (Inland Area) to Half-Pay List. 1.10.22.

ROYAL AERONAUTICAL SOCIETY NOTICES



Elections.—The following new members were elected at a Council Meeting held on October 17th :—

Associate Fellow : H. F. Parker.
Students : W. H. Broom, P. B. Humphrey,
C. J. Sanders and F. E. Siggers.
Associate Member : M. F. Wren.
Scottish Branch—Associate Member : C. Veitch.

Examination.—The Council announce the following list of successful candidates in the Associate Fellowship Examination held on September 26 :—

Theory of Structures, etc. : K. W. Berger, G. E. Page, S. O. Smith.*

Theory of Structures, etc., and Aerodynamics : S. H. Evans, T. A. Kirkup, H. J. Mackintosh.

Heat Engines and Meteorology and Navigation : S. E. Taylor.

* These candidates already possessed qualifications which exempted them from the necessity for taking the paper in Aerodynamics.

Lectures.—Owing to the continuance of rebuilding operations at the Royal Society of Arts, members are asked to note that Maj. A. R. Low's lecture, "A Review of Airscrew and Helicopter Theory, with Aeroplane Analogies," will take place at 5.30 p.m., in the theatre of the Royal United Service Institution, Whitehall, on November 2.

W. LOCKWOOD MARSH, Secretary

SOCIETY OF MODEL AERONAUTICAL ENGINEERS (London Aero-Models Association)

At the meeting held at Headquarters last Friday, reports of the Official Observers were read.

Mr. Burchell reported that a good muster of members congregated at Parliament Hill, nearly all the members flying models. A discussion followed this report on a formula worked out by Mr. Whelpton and Mr. Burchell for governing competitions, and was very much appreciated.

Members who went to Itford on Saturday last had a most enjoyable day, witnessing many excellent glides. All are enthusiastic over the arrangements made for them by Dr. Thurston, who obtained special permits from the Royal Aero Club for all the members to view the gliders. The party did not arrive back in London till 10.15 p.m. This did not prevent many of them from attending the special Flying Display at Bunker's Hill next morning.

Meetings are held at Headquarters every Friday at 7.30 p.m.

Headquarters, 20, Great Windmill Street, Piccadilly Circus, W. 1.

A. E. Jones, Hon. Secretary, 48, Narcissus Road, West Hampstead, N.W. 6.

London-Brussels-Cologne Air Mail Service

In regard to the air mail service from London to Brussels, which was reopened on Monday last and extended to Cologne, the General Post Office states that the special air fee (in addition to the appropriate ordinary postage) will be 2d. per oz. for either destination. The air mail will be closed at the counter of the General Post Office, London, at 9.0 a.m. each weekday, and will be due to reach the Brussels and Cologne aerodromes on the day of dispatch at 1.30 p.m. and 3.30 p.m. respectively.

The places which will be served by the air mail and the times at which delivery should be obtained are shown below; time of delivery is reckoned from the time of air departure from London :—

Destination.	Time of delivery.
Brussels	Same afternoon.
Antwerp and most of Belgium ..	Same evening.
Cologne	Same afternoon or evening.
Central Germany (Berlin)	{ Next morning (through connection with night mail trains from Cologne).
South Germany (Munich)	

The service should be especially useful for night mail postings in the provinces (the South-East of England excepted) and for late night postings in London.

The latest time of posting for the air mail can be ascertained from any Head Post Office. A leaflet giving particulars of the service and of other air mail services will be forwarded on application to the Secretary, Air Mails, General Post Office, London, E.C. 1.

28th Squadron Annual.

THE 3rd Annual Reunion Dinner was held at Anderton's Hotel on October 7. Twenty-eight diners—an appropriate number—were assembled, and the function was enthusiastically successful. Messages were read from some half-dozen of the Vice-Presidents, and a long list of letters from members in various parts of the country was the justification for a sincere toast to those absent friends who had been unable to attend because of distance or other reason. Lieut. S. Yates, retiring President of the 28th Squadron Old Boys' Association, was in the chair, supported by four of the Vice-Presidents in the persons of Lieuts. Cooper, Sinclair-Hill, Mackereth and Shanks. Of the Committee Messrs. Collins, Goodwin, Murchison, Preston and Williams were much in evidence, whilst the Secretary (Mr. C. Hodges, 102, Camden Street, N.W. 1) spent a very strenuous evening; so that there was no doubt as to their re-election for the ensuing year. Messrs. Corner and Matthews were added to the Committee.

Following the Loyal Toast, Mr. Murchison—our own Mr. Murchison's cousin, who worked admirably as accompanist to the musical items—proposed "The Squadron," the response being given by Lieut. Mackereth and Mr. Preston. "The Visitors" were toasted by Lieut. Cooper, and Mr. Hesketh replied. Lieut. Sinclair-Hill moved the toast to "Absent Friends." Lieut. Shanks proposed "The Committee and the Association," and the Chairman replied.

The necessary annual business was transacted expeditiously. Lieut. S. Yates, who had occupied the Presidential Chair since the inception of the Old Boys' Association, desired to be relieved of office by reason of growing commitments in other directions; and after his endeavour had been acknowledged in strenuous manner, Lieut. D. Shanks was elected unanimously and with enthusiasm as the new President.

During the course of the evening a spontaneous proposal was put forward with a view to arranging a wedding gift to the Secretary, who had recently rushed into matrimony. It is understood that a substantial sum was collected at once, and the remaining members will be circularised in due course.

By 8.30 p.m. the company had settled down to the after-dinner songs and general social items. Talent was plentiful, those helping including the retiring and the new Presidents, Messrs. Corner, Erry, Sinclair-Hill, Murchison, Partridge, Preston, Spong and Monty White, the proceedings being brought to a close with every intention of renewals of acquaintanceship at the next half-annual and annual functions.

If you require anything pertaining to aviation, study "FLIGHT'S" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages iii and xvi).

NOTICE TO ADVERTISERS

All Advertisement Copy and Blocks must be delivered at the Offices of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT

The Aircraft Engineer and Airships

36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.

Telegraphic address : Truditur, Westcent, London.

Telephone : Gerrard 1828.

SUBSCRIPTION RATES

"FLIGHT" will be forwarded, post free, at the following rates :—

UNITED KINGDOM		ABROAD*	
	s. d.		s. d.
3 Months, Post Free...	7 7	3 Months, Post Free...	8 3
6 " "	15 2	6 " "	16 6
12 " "	30 4	12 " "	33 0

These rates are subject to any alteration found necessary under abnormal conditions and to increases in postage rates.

* European subscriptions must be remitted in British currency

Cheques and Post Office Orders should be made payable to the Proprietors of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, and crossed London County and Westminster Bank, otherwise no responsibility will be accepted.

Should any difficulty be experienced in procuring "FLIGHT" from local newsvendors, intending readers can obtain each issue direct from the Publishing Office, by forwarding remittance as above.